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(54) Title: A METHOD FOR USE IN THE DETECTION OF NARCOTICS IN CLOSED CONTAINERS, PREFERABLY FREIGHT CONTAINERS, AND A SYSTEM FOR PERFORMING THE METHOD			
(57) Abstract			
<p>In a method for use in the detection of narcotic substances in the form of contraband in closed containers, preferably freight containers, air is conveyed via at least one inlet and one outlet through the container preferably in that air is blown into the container. In the air flowing out from the container through the outlet, detection for narcotic substances is performed by ordinary methods such as trained dogs or chemical analysis. The method is simple and inexpensive in use, and it is not necessary to open the container in order to carry out the inspection. A transportable system for carrying out the inspection comprises a blower, various hoses and hose connections, etc.</p>			

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A method for use in the detection of narcotics in closed containers, preferably freight containers, and a system for performing the method

- 5     The present invention relates to a method for use in the detection of narcotic substances in closed containers, preferably freight containers, and a system for use in the performance of the method.
- 10    Detection of contraband narcotic substances in ordinary means of transport takes great resources. Inspection of an ordinary freight container, which is carried by ship, railway as well as truck, e.g. requires eight men a whole day. In addition to manual inspection, equipment for X-raying containers is known, but this is so extremely expensive that the equipment is just available at quite few places in the world. One type, which is stationary, can transilluminate a whole container at once, while several transilluminations are necessary with the other type, but
- 15    this equipment, on the other hand, is transportable by truck. The equipment is quite useful for revealing whether the contents of a container are in agreement with the freight papers, i.e. whether the container contains contraband or not. But when narcotic substances are involved, these can typically not be detected by X-ray. One of the problems is the nature of the narcotic substances, and moreover the substances are smuggled in relatively small amounts and are thereby easy to conceal in or among other goods. Specially trained dogs are typically used
- 20    for the detection. The number of freight containers circulating in the transport sector is so huge that it is completely unrealistic to inspect all containers. Additionally, the freight is delayed by such an inspection, and furthermore the goods are liable to be damaged as it
- 25    is typically necessary to empty the containers. For reasons of customs and goods security, the vast majority of

containers is sealed at the shipping, and the seal is only broken by the receiver. For these and other reasons the authorities must have an extremely well-founded suspicion that a freight container contains narcotic substances in the form of contraband, before they initiate inspection of the container.

EP 0 169 057 A2 discloses a method of detecting drugs and explosives, based on the circumstance that a little bit 10 of the substances is left on the wrapping after all. In the method, the container is initially subjected to agitation, alternatively injection of a compressed air wave which is to cause some of the substances on the wrapping to become airborne, following which, by vacuum, air is 15 sucked out of the container through a hole provided in the roof of the container for the purpose. The withdrawn air is passed through a collector for collection of dust particles contained in the air, and the collector is taken out after a while. For analysis, the collector is 20 heated for evaporation of some of the dust, and finally the vapours are analyzed for traces of drugs and/or explosives.

The object of the invention is to provide a method for 25 use in the detection of whether narcotic substances should illegally be present in a given container, which takes less resources in terms of time as well as investment than the known methods, and which is simple to carry out, i.e. does not require highly specialized operators 30 and does not require special safety measures either.

This is achieved according to the invention by a method wherein air is blown into the container through an inlet so that at least part of the air present in the container 35 is discharged through the outlet.

The invention is based on the common knowledge that narcotic substances may be detected in the air. Animals having a well-developed olfactory sense, typically dogs, are used for the detection, but also other trained animals 5 may be used. Another possibility is the use of chemical analysis, as mentioned before. When one or more dogs are allowed to smell the air from a container, it can thus be determined with a great degree of certainty whether narcotic substances are contained in the container or not. 10 Alternatively, one or more air samples of the air from the container may be subjected to chemical analysis. Both methods may also be used concurrently, of course.

In contrast to suction where the air is sucked from the 15 immediate vicinity of the outlet, a blower will send an air flow into the container and create more or less turbulent air flows through the cavities in the goods in the container. During this process, mixing will take place with the air which is already present in the container, 20 at the same time as whirling of dust particles in the air takes place.

In an overall aspect, the containers have been standardized with the purpose of being capable of circulating 25 freely within the transport sector, but nevertheless there are many individual features, and many different special containers have gradually been developed.

Practically all the freight containers are provided with 30 vent holes, and these may be used as inlet and outlet in connection with the invention. This obviates the necessity of drilling holes for inlets and outlets in the containers. Some containers have so many leaks that these themselves are sufficient to serve as outlets. Here, the 35 tracker dogs may merely be allowed to walk around the container and smell it.

Some containers have no vent holes, or these may be not very accessible. But it may be turned to account here that the doors are typically sealed with rubber strips.

5 These rubber strips are relatively large and air-filled, as they must be capable of absorbing the relatively great twists that occur in the containers during transport, without the doors being damaged, and that they must be capable of being opened at any time. A preferably elongated branch serving as inlet and outlet may be inserted between the rubber strips. Injection of air close to the outlet does not interfere with the air flows. To facilitate the insertion, the doors may be opened slightly ajar, which is also possible even if these are sealed.

15

In case of the type of containers which are tight, it suffices to use one branch which serves both as inlet and outlet. After the mounting, air is injected into the container to build up a positive pressure in it, great enough for air to flow back through the branch upon interruption of the connection to the blower. The positive pressure must be large enough for a sufficient amount of air to be returned for the detection of possible narcotic substances in it, on the other hand the positive pressure must not be so high that the container is physically damaged.

To avoid an erroneous indication because of residues of narcotic substances in the system, it is necessary to 30 clean hoses and fittings which are used in connection with the withdrawal of air from the containers. Altogether, the entire system used should be cleaned in order to avoid contamination of the contents of a container, which may be very sensitive, such as e.g. fruit and meat. 35 Expediently, use is made of hoses and hose connection that may be cleaned with hot water or steam.

Refrigerated containers involve the special problem that the air is relatively cold, which may reduce the ability of a dog to detect narcotic substances. If the air from a 5 container is too cold, at least one air sample is taken, and this sample is tempered before the tracker dog is allowed to smell the air sample in order to detect narcotic substances. However, it has been found that the tracker dogs can tolerate air from refrigerated containers where 10 the temperature is kept at 5 °C, without difficulty.

Another factor which must be taken into consideration for refrigerated containers is that these are provided with a refrigerating assembly equipped with a blower which sends 15 a cold air flow into the container. It is realized by the invention that the blower of this refrigerating assembly may be utilized together with a fresh-air valve and a blow-off valve. When these valves are opened, the blower sends fresh air into the container, and air is simultaneously discharged through the blow-off valve, from which 20 air may be conveyed to tracker dogs or collector equipment.

However, there may also be other reasons for collecting 25 and saving air samples, e.g. insufficiency of tracker dogs, and as evidence. For this purpose, a hose from an outlet may be provided with a replaceable filter, which may be removed, provided with identification and saved in an air-tight container. The tracker dogs can then smell 30 the samples later. This also has the effect that the tracker dogs do not necessarily have to be taken along for an inspection, which in turn saves resources.

The invention also comprises a system for use in the performance of the method, said system being constructed as 35 a transportable unit comprising a blower with associated

hoses and fittings for connecting the system with a container. The system may be constructed as a cabinet intended to be mounted on a sack truck or the like, so that it is easy to transport.

5

The system moreover comprises special connecting units intended for tight-fitting mounting over the vent holes in the containers. As the vent holes are formed differently in the various containers, and since inlet and outlet in the refrigerated containers again are different, it is necessary to have different structures of the connecting units.

A simple way of securing the connecting units is by means 15 of magnets, as the containers are of steel. The connecting units are otherwise made of plastics, e.g. glass fibre.

An embodiment of the invention will be explained more 20 fully below with reference to the accompanying drawing. In the drawing:

fig. 1 shows a schematic view of an inspection of an ordinary freight container,

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fig. 2 shows a schematic view of a system according to the invention,

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fig. 3 shows a schematic view of one vent opening,

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fig. 4 shows a schematic view of another vent opening,

fig. 5 shows a schematic view of one vent opening in a refrigerated container,

35

fig. 6 shows a schematic view of one embodiment of a connecting unit in a mounted position,

5 fig. 7 shows a schematic view of another embodiment of a connecting unit in a mounted position,

fig. 8 shows a schematic view of one connecting unit for a refrigerated container, seen from the rear side, and

10 fig. 9 shows a schematic view of a unit for insertion between the doors in a container.

Fig. 1 of the drawing shows an ordinary freight container 1 having two doors 2 at the end and a vent opening 3a, 3b 15 at each side. These are arranged at the top at their respective sides at each end of the container, which gives a good airing of the interior of the container.

Air is sent into the container with a dry-running side 20 channel blower 4. The blower has a capacity of about 300 m<sup>3</sup>/h with a pressure of about 125 mb. A blower having a smaller capacity of e.g. 220 m<sup>3</sup>/m will probably be sufficient, and it will simultaneously reduce the size of the system. An air cleaning filter 5 is provided on the suction side of the blower, so that the air blown into the 25 container is as clean as possible. On the pressure side, there is a pressure relief valve 6, and the blower is connected with the container by a hose 7 in which a shut-off valve 8 is additionally provided. The pressure relief 30 valve prevents the building up of a too high pressure in the container, which might damage sensitive goods. To additionally increase the certainty that the goods will not be damaged, the system may be provided with a timer that cuts off the blower e.g. after 10 minutes. It is noted in 35 this connection that an ordinary 40 feet container has a cubic content of about 73 m<sup>3</sup>.

Air flows from the vent opening 3a into and spreads in the interior of the container. At the same time, air begins to flow from the interior of the container out through the other vent opening 3b, with which a hose 9 is connected. The hose accommodates a shut-off valve 10 after a manometer 11, and the hose finally ends in a funnel 12 having a removable filter.

10 The entire system is assembled in a cabinet 13 which may be mounted and transported on a sack truck 14. The cabinet has room for the various hoses, fittings, etc., and the blower 4 is mounted in the bottom. The cabinet may be closed and locked with a door 15.

15 As mentioned before, the vent openings may have different structures, and three different ones are shown in figs. 3-5. The side walls of most containers are formed by trapezoidal walls 16, and the vent openings are typically 20 arranged in the bottom of an inwardly extending fold. In fig. 3, the vent opening is formed as a housing 17 mounted in the bottom of a fold over a hole in the side wall. The housing is in a protected, retracted position relative to the outer faces of the folds. The opening in 25 the housing 17, which faces downwards, is covered by a net or grating 18. The structure shown in fig. 4 is formed by a plate 19 mounted against an upper longitudinal edge beam 20 on the container. The plate is screwed on to the tops of two adjacent outwardly extending folds 30 and covers a cut-out in the intermediate inwardly extending fold. The vent opening below the plate member 19 is likewise covered by a grating 18. Fig. 5 shows one embodiment of vent openings 21a, 21b for refrigerated containers. The openings are formed by two circular cut-outs 35 in the side and are likewise covered by a net. The degree of opening of the two vent openings 21a, 21b may be ad-

justed with a circular plate 22, which is rotatably suspended in its centre from a bolt. The numeral 23 designates a stiffening beam which also serves as a turning handle.

5

Fig. 6 shows a connecting unit 24 having a shape such that it fits into an inwardly extending fold and simultaneously covers a vent opening. The front of the unit 24 forms a transverse beam 25 which engages the outer side 10 of the two adjacent outwardly extending folds in the side wall. The unit is secured with magnets in the beam. The unit also has sealing strips for sealing engagement with the side wall. A connecting branch 27 is provided on the front for the mounting of a hose.

15

The structure shown in fig. 7 of a connecting unit differs from the preceding one by comprising a housing 28 which fits into the bottom of a fold on the side wall as well as over a vent opening. Forwardly on the housing, 20 there is a transverse beam 29 which is likewise secured by magnets 26. The housing 28 is pressed into sealing engagement with the side wall by a pointed screw 30 or the like in the transverse beam.

25

In refrigerated containers, a connecting unit 31 as shown in fig. 8 is used. The unit is formed by a housing which is divided into two chambers 32a, 32b, each having its own opening 33a, 33b for a hose connecting branch. A seal 34 is provided along the edge and the separation between 30 the two chambers.

To mount the unit on e.g. a refrigerated container as shown in fig. 5, the throttle plate 22 is removed and the unit is placed over the vent openings 21a, 21b so that 35 these are present in their respective chambers 32a, 32b and serves as inlet and outlet, respectively. It is noted

that the vent openings in the refrigerated containers typically occur in a plane plate.

Fig. 9 of the drawing shows a unit for insertion between 5 the doors 2 in a container. The unit consists of a flat housing 35 divided by a transverse wall 36. The rear edge of the housing has a connecting branch for connection with the blower, so that air is blown out through the gap 38 in the front edge. The outlet is formed by the gap 39 10 in the front edge of the housing which, through the housing, communicates with a branch 40 in the back of the housing. The unit is moved with the front edge of the housing 35 inwardly between the rubber strips on the doors, so that the gaps 38, 39 communicate with the interior 15 of the container. For the unit to be positioned, the doors are possibly opened slightly ajar and then closed around the unit.

It is noted that hoses, fittings, etc. are of a material 20 which allows the system to be cleaned with hot water or steam to avoid false detection, i.e. to avoid a positive detection because of residues of narcotic substances in the system. Sterilization with e.g. steam avoids contamination of sensitive goods, such as food products.

25 The air is preferably blown into the container in a continuous air flow, but, of course, it may also take place intermittently so as to provide a pulsating air flow which promotes stirring of the air in the container.

30 The invention thus provides a simple and easy method of detecting narcotic substances in freight containers, which is moreover not destructive, and which does not necessitate breaking a seal, if any, of the container. The 35 invention furthermore provides a simple and relatively inexpensive system for performing the method. The system

is moreover unique in that it is easy to transport and additionally affords the possibility of performing inspection of the containers on the means of transport.

## P a t e n t   C l a i m s :

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1. A method for use in the detection of narcotic substances in closed containers, preferably freight containers, wherein detection is performed for possible narcotic substances in air from an outlet in the container alternatively a dust sample from the air, c h a r a c t e r - i z e d in that air is blown into the container through an inlet so that at least part of the air present in the container is discharged through the outlet.

2. A method according to claim 1, c h a r a c t e r - i z e d in that existing vent holes in the containers are used as inlet and outlet.

3. A method according to one of claim 1 or 2, c h a r - a c t e r i z e d in that in containers without vent holes but with doors sealed by rubber strips, at least one branch is inserted between the rubber strips which serve as inlet and outlet.

4. A method according to claim 3, c h a r a c t e r - i z e d in that only one branch is inserted between the rubber strips, and that air is then blown into the container through the branch to build up a positive pressure in it, great enough for sufficient air, upon interruption of the connection to the blower, to flow out of the branch for possible narcotic substances to be detected therein.

5. A method according to claim 1, c h a r a c t e r - i z e d in that in connection with refrigerated containers which are provided with a refrigerating assembly equipped with a blower intended to send a cold air flow into the container, which is additionally provided with a

fresh-air valve and a blow-off valve, the existing blower is utilized for sending an air flow into the container, with the fresh-air valve held open and also with the blow-off valve held open, from which air is conveyed to a  
5 trained animal for the detection of narcotic substances or the collector equipment.

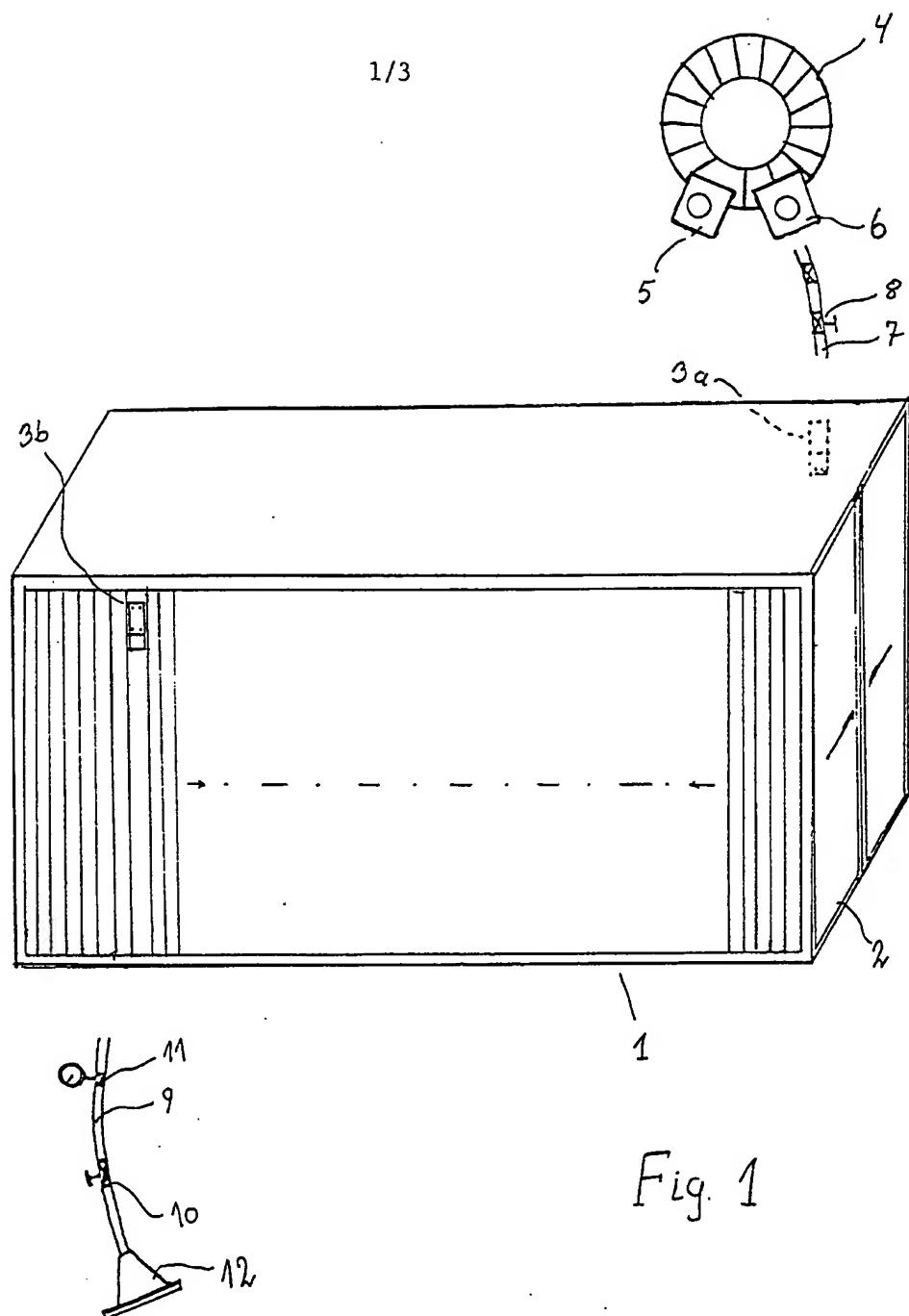
6. A method according to one of claims 1-5, characterized in that in connection with refrigerated containers at least one air sample is collected and is tempered before tracker animals are allowed to smell  
10 the air sample.

7. A method according to one of claims 1-6, characterized in that use is made of hoses and hose connection which may be cleaned or sterilized with hot water.  
15

8. A system for use in the performance of the method according to claims 1-7, characterized in that it is constructed as a transportable unit comprising a blower with associated hoses and fittings for connecting the system with a container.  
20

25 9. A system according to claim 8, characterized in that it comprises connecting units intended for tight-fitting mounting over vent holes in containers.

10. A system according to claim 9, characterized in that the connecting units comprise magnets for securing the units on the containers.  
30



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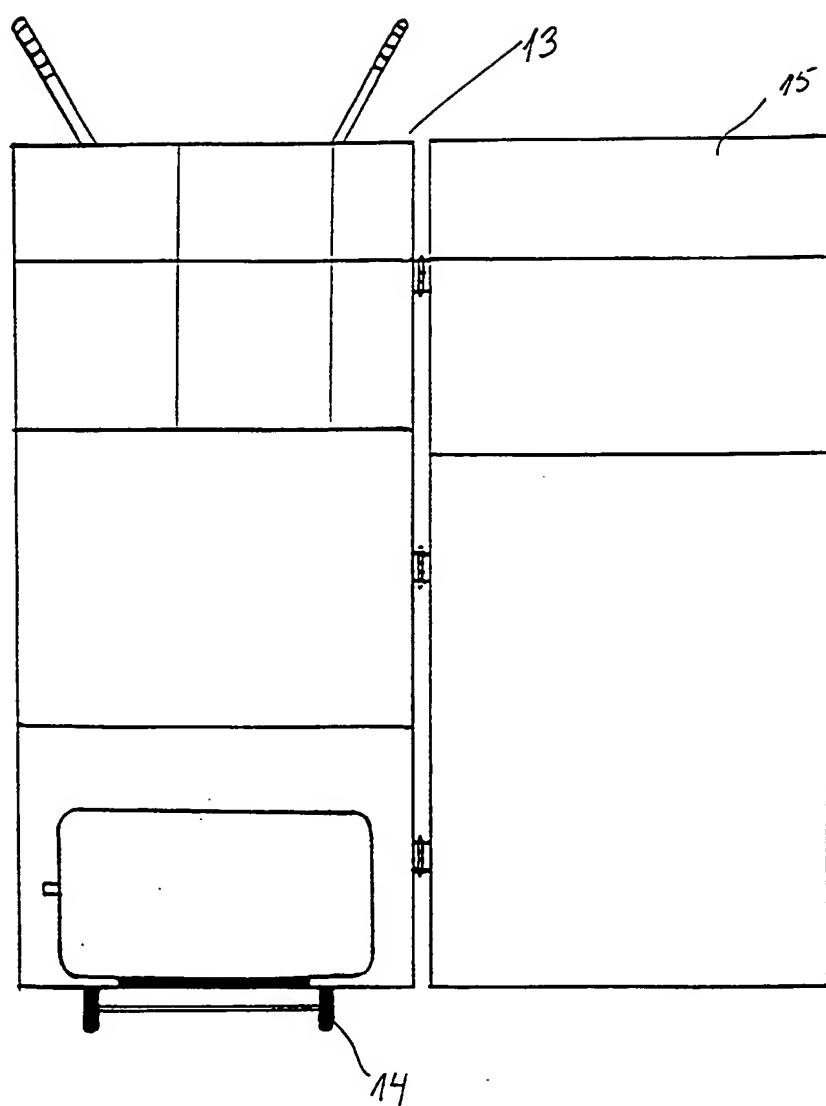


Fig. 2

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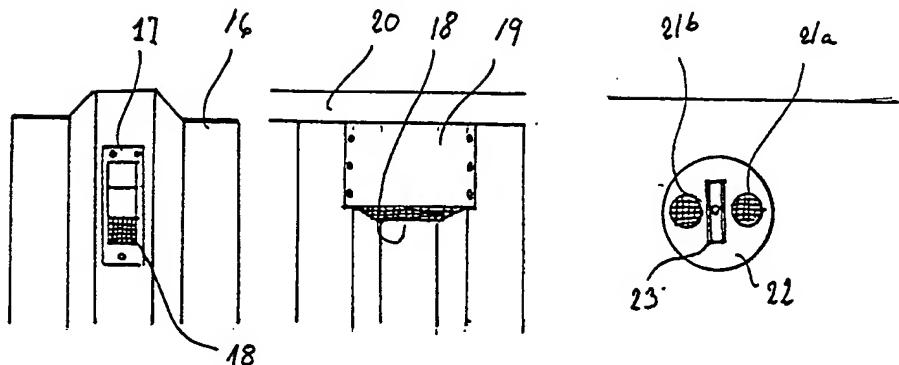


Fig. 3

Fig. 4

Fig. 5

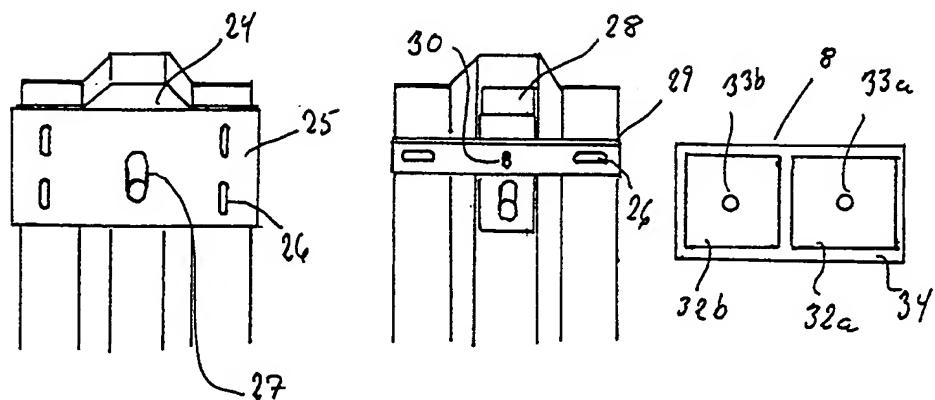


Fig. 6

Fig. 7

Fig. 8

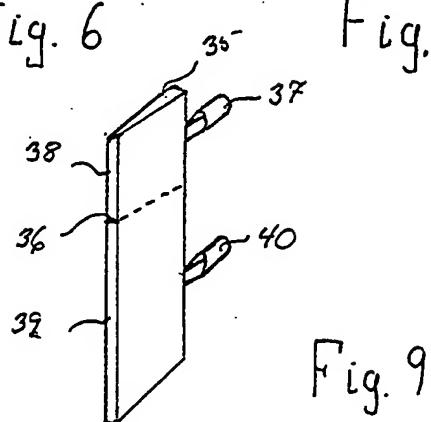


Fig. 9

## INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER		
<b>IPC6: G01N 33/94, G01N 33/00</b> According to International Patent Classification (IPC) or to both national classification and IPC		
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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0169057 A2 (BRITISH AEROSPACE PUBLIC LIMITED COMPANY), 22 January 1986 (22.01.86), page 3, line 4 - line 8; page 12, line 26 - page 13, line 3; page 13, line 24 - page 14, line 2	1-4,6-8
A	--	5,9-10
P,A	US 5795544 A (WARREN W. MATZ), 18 August 1998 (18.08.98), column 2, line 60 - line 62	1-10
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P,A	WO 9817999 A1 (REVENUE CANADA), 30 April 1998 (30.04.98), page 1, line 8 - line 11	1-10
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Information on patent family members

02/03/99

International application No.

PCT/DK 99/00002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0169057 A2	22/01/86	CA 1224940 A GB 2162944 A,B JP 1912471 C JP 6017902 B JP 61105483 A US 4580440 A US 4718268 A	04/08/87 12/02/86 09/03/95 09/03/94 23/05/86 08/04/86 12/01/88
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